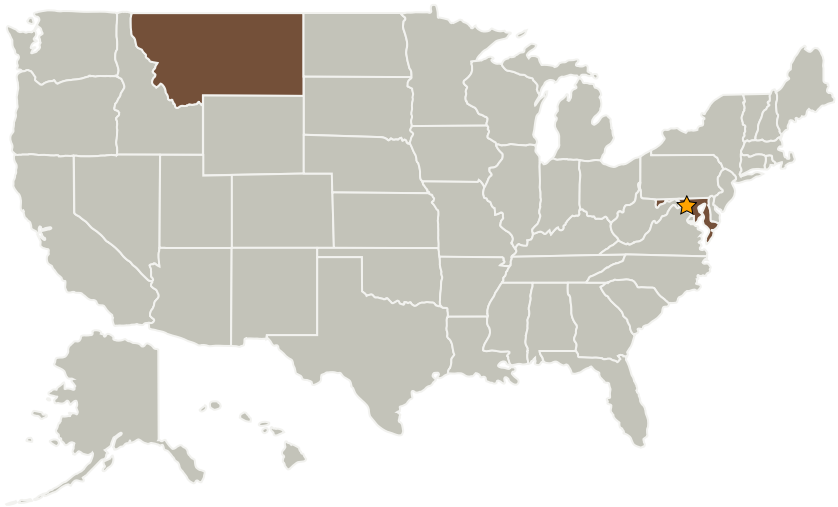
Ridge Waveguide Structures in Magnesium-Doped Lithium Niobate, Phase I

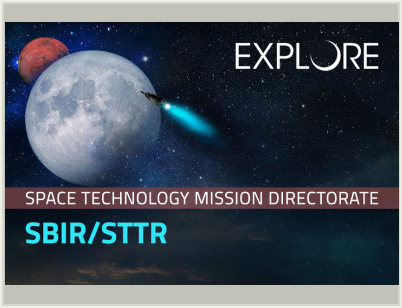
Completed Technology Project (2009 - 2010)

Project Introduction

In this NASA Phase I STTR effort, the feasibility of fabricating isolated ridge waveguides in 5% magnesium-doped lithium niobate (5% MgO:LN) will be established. Ridge waveguides in MgO:LN will significantly improve the power handling and conversion efficiency, increase photonic component integration, and be well suited to space based applications. The key innovation in this effort is to combine recently available large, high photorefractive damage threshold, z-cut 5% MgO:LN with novel ridge fabrication techniques to achieve high optical power, low cost, high volume manufacturing of frequency conversion structures. The proposed ridge waveguide structure should maintain the characteristics of the periodically poled bulk substrate, allowing for the efficient frequency conversion typical of waveguides and the high optical damage threshold and long lifetimes typical of the 5% doped bulk substrate. The low cost and large area of 5% MgO:LN wafers and the improved performance of the proposed ridge waveguide structure will enhance existing measurement capabilities as well as reduce the resources required to achieve high performance specifications. For these reasons, the development of ridge waveguides in 5% MgO:LN directly addresses NASA's Innovative Sensors, Detectors and Instruments for Science Applications, STTR subtopic T4.01: Lidar, Radar and Coherent Fiber Bundle Arrays.

Primary U.S. Work Locations and Key Partners





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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Goddard Space Flight Center (GSFC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Goddard Space Flight Center(GSFC)	Lead Organization	NASA Center	Greenbelt, Maryland
ADVR, Inc.	Supporting Organization	Industry	Bozeman, Montana

Primary U.S. Work Locations	
Maryland	Montana

Project Transitions

January 2009: Project Start

January 2010: Closed out

Project Management

Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Principal Investigator:
Will Suckow

Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.1 Remote Sensing Instruments/Sensors
    - TX08.1.1 Detectors and Focal Planes